

Original Article

Creativity project method in academic physical education process

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Abstract

Projects to integrate fine arts technologies and tools in the self-reliant creativity component of the academic Physical Education discipline has never been subject to analyses and studies as yet.

Objective of the study was to rate benefits of the creative project activity with application of the fine arts technologies and tools for the self-reliant creativity component of the academic Physical Education discipline.

Subject to the study were the fourth-year students (n=130) of Institute of Fine Arts split up into Study Group (SG, n=74) and Reference Group (RG, n=56); with the SG self-reliant training program designed to include a variable creativity project component; and the RG curriculum left free of any project activity, with the academic progress tested only by the standard test reviews.

Study results demonstrated benefits of the project method for the academic education process as verified by the SG vs. RG progress tests that demonstrated higher competences and increased motivations for physical activity and healthy lifestyles due to reduction of bad habits. The academic creativity project activity model within the self-reliant training component was rated as much more appealing and emotional versus the traditional education models.

Conclusion: Academic Physical Education faculties are recommended to apply the new education models in the self-reliant activity component of the theoretical Physical Education curricula.

Keywords: physical education, students, self-reliant activity, creativity projects.

Introduction

The academic research communities have been giving a growing priority to national health problems for the last decade (Apanasenko, 2014). Physical inactivity of the modern generations is reported to give rise to multiple diseases including cardiovascular pathologies, diabetes, obesity, musculoskeletal disorders etc. (Kostyuchenko & Orekhov, 2010). Recent studies have found the persistent health deterioration trend in the student communities in Russia (Bal'sevich, 2010), and it is natural that a special emphasis is now made on the young people's physical activity encouragement initiatives (Lubysheva, 2012) viewed by researchers and analysts as pivotal for the health protection and improvement; non-medical disease prevention (Garkusha, 2014; Skead & Rogers, 2016); muscular imbalance correction (Aftimichuk & Varvarich, 2013; Nosko, Razumeyko, Iermakov, & Yermakova, 2016); body adaptability increasing (Vitun, 2009; Kolokoltsev, Buykova, & Bulnaeva, 2017); and life prolongation (Blair, Cheng, & Holder, 2001; Kolokoltsev, 2016) initiatives. Students have long been ranked on top of the health risk groups vulnerable to many diseases due to high academic loads and associated neuro-psyche stresses (Abdullina, 2014; Lebedinsky, & Kolokol'tsev, 2016); physical inactivity (Prosvirina, Kolokol'tsev, Kolchanova, Cieslicka, & Stankiewicz, 2015); and poor if any motivations for healthy lifestyles (Hortigüela-Alcalá, Pérez-Pueyo, & Moncada-Jiménez, 2015; Gavrilik, 2016). Lately researchers have given a growing priority to the initiatives to engage students in regular physical training sessions (Lakhtin, 2011); build up due health culture starting at least from the school period (Yermakova, 2015); and encourage the young people's interest in all forms of physical activity (Dupont, Carlier, Grrard, & Delens, 2009; Arziutov, Iermakov, Bartik, Nosko, & Cynarski, 2016) viewed as an integral component of a healthy lifestyle (Osipov, Fedorova, Kochetkova, & Loginov, 2017). Researchers make an emphasis on due motivations of students for physical training in the academic physical education and sports process (Yurchyshin, 2014; De Meyer, Soenens, Aelterman, De Bourdeaudhuij, & Haerens, 2016). Regular physical training sessions were found beneficial as verified, for instance, by physical health, functional state, mental and emotional progress test rates of Russian female students from Ivanovo (Stepanova & Borodulina, 2016).

It is the theoretical training component that plays a key role in the academic Physical Education curriculum (Lakhtin, 2011; Moskalenko, Sichova, & Anastasieva, 2012), with some studies (Rocha et al., 2013) indicating the inadequate theoretical competency being responsible for the poor efficiency of the academic physical education process. Furthermore, progress in motor skills mastering process unsupported by due

theoretical knowledge was found to give no way for the students to succeed in the self-reliant physical practices (O'Leary, Wattison, Edwards, & Bryan, 2015; Vaskov & Sizonenko, 2015). An educational experiment by Chistyakova and Pravdov (2011) showed benefits of the physical and cognitive children's activity being duly harmonised in the relevant training model. Bal'sevich (1991) emphasised the poor theoretical awareness of the national population of the benefits of physical training, with those in special need of a motor activity being found particularly innocent in these matters.

It should be noted that the valid Russian Federal State Higher Professional Education Standard (FSHPES) assigns 72 hours for the theoretical training component, 36 hours for lectures and 36 hours for student self-reliant activity (SRA) in the academic Physical Education curriculum. The standard is viewed by the regulator as providing a conceptual guidance and recommendations to the academic educators motivating them to design their innovative physical education models, methods and tools to improve content of the existing curriculum so as to encourage the individual physical progress of the trainees (Tajmazov, Kriuchek, & Grigor'ev, 2010). The new physical education models need to be designed to motivate students for regular physical activity and habitual healthy lifestyles. Benefits of some interdisciplinary education projects and scenarios were reported by Dmitriev (2013). Special individualised physical self-training programs with an emphasis on the professional application components were proved beneficial too (Iermakov, Ivashchenko, & Guзов, 2012). Analysis of the available research literature demonstrates that the matters of the theoretical competency building in students with a special emphasis on the competences required for the self-reliant physical training are increasingly important and need to be addressed – in the context of shortage of the relevant study data. Projects to integrate visual art technologies and tools in the self-reliant creativity component of the academic Physical Education discipline have never been subject to studies and analyses as yet.

Hypothesis: It was assumed that the proposed creativity project to advance the self-reliant activity under the academic Physical Education curriculum should help build up the fine arts students' interest in physical training and healthy lifestyles.

Objective of the study was to rate benefits of the creativity project activity with application of the visual art technologies and tools for the self-reliant creativity component of the academic Physical Education discipline.

Material and Methods

Participants: Subject to the study were fourth-year students (n=130 aged 19-21 years) of Institute of Fine Arts split up into Study Group (SG, n=74, including 28 males and 46 females) and Reference Group (RG, n=56 including 24 males and 32 females).

Design of the study: The theoretical education component of the valid Physical Education curriculum assigns 36 hours for the self-reliant training activity. The SG self-reliant training model was designed to include a variable creativity project component; whilst the RG education process was left free of a creativity project activity, and the academic progress was tested by the standard test reviews. Themes of the creativity project were the following:

Theme 1: Healthy lifestyle promotion. The students were required to produce a leaflet, poster or some other piece of visual art in A4 format to demonstrate the harmful effects of asocial behavioural models on the young people.

Theme 2: Visualising human physical qualities and sports. The students were required to produce the following:

a) 30x30cm mosaic featuring sport pictograms focused on the best human physical qualities including endurance, strength, speed, flexibility and coordination/ dexterity; and

b) 25-cm high miniature sculpture of an athlete in any sport discipline.

Theme 3: Sport design. The students were required to produce a sketch of the following (in A4-format):

a) Sport medal, badge etc. featuring Lake Baikal;

b) Sport outfits for any winter sport discipline;

c) Fan scarf for an academic sport team; and

d) Logo of the university Physical Education and Sports department including the university emblem.

Theme 4: Culture of movements. The students were required to produce (in A4-format) 5 pieces of art featuring the beauty of an athlete's body.

Prior and after the experimental creativity project the subjects were surveyed and tested to rate their progress in the academic Physical Education process.

Statistical analysis

The study data were statistically processed using STATISTICA 6.0 and Microsoft Excel toolkits. Statistical significance of the data differences was rated by Xi-square (χ^2), (critical value of $\chi^2=3.841459$ at $p<0.05$; with data differences deemed statistically significant at $\chi^2>\chi^2_{critical}$). Statistical significance of the differences in the subjects' theoretical competences was rated using the Student's t-criterion.

Results

The pre-experimental tests of the SG and RG showed their theoretical knowledge, skill and ability rates in the physical culture domain being quite low: see Table 1 hereunder.

Table 1. Variations of the subjects' motivations for physical activity and healthy lifestyle, in % (critical value of $\chi^2=3.841459$ at $p<0.05$)

Test rates	SG			RG		
	Prior to experiment	After experiment	χ^2	Prior to experiment	After experiment	χ^2
Physical culture values	Strength	Health		Strength	Strength	
Morning exercises	1,35%	24,3% <input type="checkbox"/>	17,451	1,8%	5,4% <input type="checkbox"/> <input type="checkbox"/>	8,467
Physical exercises, sports	24,3%	43,2% <input type="checkbox"/>	5,92	23,2%	23,2% <input type="checkbox"/>	5,650
Active rest	27,0%	48,6% <input type="checkbox"/>	7,354	23,2%	30,3% <input type="checkbox"/>	4,417
Passive rest	73,0%	51,7% <input type="checkbox"/>	7,354	76,8%	69,7% <input type="checkbox"/>	5,756
Smokers	33,8%	20,2%		35,7%	32,1%	2,372
Alcohol abusers	47,2%	29,7% <input type="checkbox"/> <input type="checkbox"/>	4,822	46,4%	45,3%	3,071
Body tempering	0%	8,1%		0%	0%	
Self-massage	0%	12,2%		0%	0%	

Note: ☐ statistically significant difference ($p < 0.05$) of the SG pre-experimental versus post-experimental data;

☐ ☐ statistically significant difference ($p < 0.05$) of the SG versus RG post-experimental data

Prior to the experiment, strength was ranked on top of the physical culture values both by SG and RG: see Table 1 above. The post-experimental survey data showed 92.8% of the SG giving the top priority to health that may be interpreted as indicative of the subjects' attitude to physical culture and sports being revised – versus the RG that showed no change in the values structure after the experiment.

Furthermore, both of the groups were virtually the same prior to the experiment in the numbers of sporting students: 24.3% in SG versus 23.2% in RG ($p > 0.05$). The post-experimental survey showed growth in the numbers of those who prefer active rest: by 1.8 in the SG ($p < 0.05$) versus 1.3 in the RG ($p > 0.05$). Preference of passive rest in the SG was tested to fall 1.4 times ($p < 0.05$) versus 1.1 times in the RG ($p > 0.05$). These data may be interpreted as indicative of the SG showing growth of motivations for physical activity and healthy lifestyle as a result of the experiment.

Numbers of smokers were tested to fall 1.6 times in the SG ($p < 0.05$) versus 1.1 times in the RG ($p > 0.05$); and the numbers of alcohol abusers were tested to fall 1.6 times in the SG ($p < 0.05$) versus virtually no fall in the RG. The post-experimental data showed the body tempering practices and self-massage being applied by SG only (8.1% and 12.2%, respectively).

Prior to the experiment, the theoretical knowledge tests yielded low rates in both of the groups: 2.86 ± 0.05 points in the SG versus 2.82 ± 0.08 points in the RG ($p > 0.05$). The post-experimental data were indicative of the knowledge growth in the SG versus RG to 4.39 ± 0.07 and 3.24 ± 0.09 points, respectively ($p < 0.05$), with the average rate being 35.5% higher in SG. Furthermore, the knowledge tests showed better progress in the SG versus RG. Therefore, there are good grounds to conclude that the SG gave a higher priority to the creative approaches to the Physical Education curriculum under the creativity project that was found to contribute to the enthusiasm and emotionality of the learning process as verified by 87.8% of the SG. The innovative creativity project in the self-reliant learning process was found to secure progress of the cognitive abilities, encourage the professional excellence process in the cultural, artistic and design domain as verified by 94% of the SG.

Discussion

The national higher education system has been reformed for the last few years, and the reforms embraced its physical education domain as well (Khristovaia, 2013). Some study reports (Moskalenko et al., 2012; Alptekin & Oberer, 2013) demonstrated benefits of the theoretical physical education driven by innovative technologies as verified by the health and physical qualities test rates (Standal, Moen, & Moe, 2014), growing motivations and acceptance of healthy lifestyles in the academic communities (Yermakova, 2015).

The study data indicative of the low prior theoretical knowledge rates in the physical education domain are supported by some other national (Lakhtin, 2011) and foreign studies (Swagatam, Subhodip, & Souvik, 2013; O'Leary et al., 2015) as well as our prior study report (Kolokoltsev, 2016; Kolokoltsev, & Ambarcumian, 2016). This is particularly true for the self-reliant physical education and values of healthy lifestyle in the off-class hours. We found that the self-reliant physical training with an emphasis on the applied professional skills helps notably improve the academic progress rates in the subjects (Iermakov et al., 2012). The variable component of the curriculum that we have designed and proposed is intended to encourage the students' interest in self-reliant physical training activity and healthy lifestyle; and this finding is supported by some other studies of the mechanisms to facilitate the personal values and motivations for physical training process (Moskalenko et al. 2012; Stetsenko, & Arhipenko, 2015).

The experiment resulted in the numbers of the SG subjects preferring passive rest falling by 21.3%. Reduction in the passive rest preferences was found to correlate with the growing students' physical activity as demonstrated by other studies (Iermakov, Arziutov, & Jagiello, 2016; Iermakov, Podrigalo, & Jagiello, 2016).

Every modern human activity implies a variety of ideas and projects being shared in different sciences. Modern higher education systems give a growing priority to interdisciplinary connections in the education process considering them among the most important social missions of the academic education system with a special emphasis on effective interaction of the science with practice. However, creativity projects implemented by students (including those to integrate fine arts technologies in the academic Physical Education discipline) have not been subject to serious studies as yet. Findings of our study have contributed to the knowledge of the above interdisciplinary connections (Vishniakova, 2007; Dmitriev, 2013) and made it possible to step up the theoretical academic progress by the physical education activity being supported by aesthetic culturing process (Roters, 2013; Shypulo, 2015). We agree with the other authors' opinion that the key role in the above initiatives should be played by the psychological (Podrigalo et al., 2017) and aesthetic components of the education process (Potop, 2013; Khudolii, Ivashchenko, Iermakov, & Rumba, 2016) plus artistic aspects of aesthetic sport disciplines (Potop, Manole, Nistor, & Andreyeva, 2015).

Questionnaire survey under the study showed both of the groups virtually non-applying body tempering and self-massage practices in the physical education process prior to the experiment that may be indicative of the inadequate knowledge, skills and abilities for these practices, and this finding is confirmed by other study reports (Kotelevskiy, 2016; Fotynyuk, 2017).

The fourth-year theoretical education project under the academic Physical Education curriculum at Institute of Fine Arts was finalised by an examination exhibition of the students' self-reliant creativity projects, with the academic progress rated based on the total points won by the project themes.

We believe that the innovative creativity education project activity may be recommended for implementation under the self-reliant education component of the academic Physical Education curriculum; and it will help develop students' personal values and motivations for physical activity and, consequently, their health standards.

Conclusion

Project to integrate fine arts technologies and tools in the self-reliant creativity component of the academic Physical Education discipline was found to motivate students for physical activity and healthy lifestyles.

The innovative creativity project method within the self-reliant education component helped improve the students' cognitive functionality and facilitate their professional progress.

The project to integrate the fine arts technologies and tools in the self-reliant creativity component of the academic Physical Education discipline made it possible to expand the knowledge of interdisciplinary connections and improve the academic progress in the theoretical domain with the students' physical education being duly harmonised with the aesthetic culturing process.

Conflict of interests

We believe that there is no conflict of interests.

References

- Abdullina, L.B. (2014). Building students' healthy lifestyle in modern university. *Zdorov'esberegaiushchee obrazovanie*, 2, 78-82. (in Russian)
- Aftimichuk, O.E., & Varvarich, A.V. (2013). Muscular Imbalance Correction in the Power Fitness Trainin. *European Journal of Physical Education and Sport*, 1, 4-12.
- Alptekin, E., & Oberer, B.J. (2013). Putting Google+ to the Test: Assessing Outcomes for Student Collaboration, Engagement and Success in Higher Education. *Procedia – Social and Behavioral Sciences*, 83 (4), 185–189.
- Apanasenko, G.L. (2014). Planetary evolution and human health. *Istoricheskaia psikhologiya i sociologiya istorii*, 7 (1), 91–101. (in Russian)
- Arziutov, G., Iermakov, S., Bartik, P., Nosko, M., & Cynarski, W. J. (2016). The use of didactic laws in the teaching of the physical elements involved in judo techniques. *Ido Movement for Culture*, 16(4), 21-30. doi:10.14589/ido.16.4.4
- Bal'sevich, V.K. (1991). Intellectual vector of individual physical culture (to the problem of physical culture knowledge development). *Teoriya i Praktika Fizicheskoy Kultury*, 7, 37. (in Russian).
- Bal'sevich, V.K. (2010). Health promoting function of education in Russia (materials for development of national project for health improvement of Russian younger generation in the period 2006 - 2026. *Zdorov'e dlia vsekh*, 1, 45-5 (in Russian)
- Blair, S., Cheng, Y., & Holder, J. (2001). Is physical activity or physical fitness more important in defining health benefits? *Medicine and Science in Sports and Exercise*, 33(6 Suppl.), 379-399.

- Chistiakova, A.A., & Pravdov, M.A. (2011). Integration of motor and cognitive activities in health and safety basics cultivation process in senior preschool children]. *Uchenye zapiski universiteta imeni P.F. Lesgafta*, 1 (71), 136-139. (in Russian)
- De Meyer, J., Soenens, B., Aelterman, N., De Bourdeaudhuij, I., & Haerens, L. (2016). The different faces of controlling teaching: implications of a distinction between externally and internally controlling teaching for students' motivation in physical education. *Physical Education and Sport Pedagogy*, 21(6), 632-652.
- Dmitriev, S.V. (2013). Sphere of Athlete's Self - consciousness – Paradoxes, New Notions, New Realities or Terra Incogn. *European Journal of Physical Education and Sport*, 1 (1), 22-31.
- Dupont, Jean-Philippe., Carlier, Ghislain., Grrard, Philippe., & Delens, Crcile. (2009). Teacher-student negotiations and its relation to physical education student motivational processes: an approach based on self-determination theory. *European physical education review*, 1(15), 21-46.
- Fotynyuk, V.G. (2017). On health protection and health related physical culture trainings of first year students. *Physical Education of Students*, 21(1), 17-21. doi:10.15561/20755279.2017.0103
- Garkusha, S.V. (2014). Health-promotion potential of motor activity. *Zdorov'e dlia vsekh*, 1, 15-21. (in Russian)
- Gavriliuk, M.V. (2016). Ways to improve efficiency of academic physical education. *Zdorov'e dlia vsekh*, 2, 21-24. (in Russian)
- Hortigüela-Alcalá, D., Pérez-Pueyo, Á., & Moncada-Jiménez, J. (2015). An analysis of the responsibility of physical education students depending on the teaching methodology received. *Journal of Physical Education and Sport*, 15(2), 202-207. doi:10.7752/jpes.2015.02031
- Iermakov, S.S., Arziutov, G.N., & Jagiello, W. (2016). Quick training of students to judo techniques. *Archives of Budo*, 12, 15-24.
- Iermakov, S.S., Ivashchenko, P.I., & Guzov, V.V. (2012). Features of motivation of students to application of individual programs of physical self-preparation. *Physical Education of Students*, 4, 59–61.
- Iermakov, S.S., Podrigalo, L.V., & Jagiello, W. (2016). Hand-grip strength as an indicator for predicting the success in martial arts athletes. *Archives of Budo*, 12, 179-186.
- Khristovaia, T.E. (2013). Students' current health status and ways to improve it. *Slobozhans'kij naukovosportivnij visnik*, 1, 74–78. (in Russian)
- Khudolii, O.M., Ivashchenko, O.V., Iermakov, S.S., & Rumba, O.G. (2016). Computer simulation of junior gymnasts' training process. *Science of Gymnastics Journal*, 8(3), 215-228.
- Kolokoltsev, M.M. (2016). Features of constitutional characteristics of young males aged of 17-20 years, natives of the baikal region with regard to their functional groups of health. *Gigiena i Sanitariia*, 95(4), 392-396.
- Kolokoltsev, M. M., Buykova, O. M., & Bulnaeva, G. I. (2017). Characteristic features of hemodynamics in students engaged in physical culture. *Teoriya i Praktika Fizicheskoy Kultury*, 3, 8.
- Kolokoltsev, M.M. (2016). Dynamics of motivational component of physical fitness of male technical university students. *Valeologiia*, 1, 11–15. (in Russian)
- Kolokoltsev, M.M., & Ambarcumian, R.A. (2016). Psychoemotional state in context of foreign students' progress based on innovative extended motor regime. *Teoriya i Praktika Fizicheskoy Kultury*, 11, 59. (in Russian)
- Kostiuchenko, V.F., & Orekhov, E.F. (2010). Physical culture as health promotion factor. *Zdorov'e dlia vsekh*, 1, 17-22. (in Russian)
- Kotelevskiy, V.I. (2016). Integrative technology of massage manipulations in physical rehabilitation of students with backbone pathology. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 20(3), 31-40. doi:10.15561/18189172.2016.0305
- Lakhtin, A.Iu. (2011). *Adaptation of first-year students to university education via physical education*. PhD. Diss. Barnaul. (in Russian)
- Lebedinsky, V. Y., & Kolokol'tsev, M. M. (2016). Physical education improvement prospects for non-sport university students. *Teoriya i Praktika Fizicheskoy Kultury*, 6, 44-45.
- Lubysheva, L.I. (2012). Sports culture phenomenon in context of social pedagogical analysis. *Kul'tura fizicheskaia i zdorov'e*, 3, 5-11. (in Russian)
- Moskalenko, N., Sichova, T., & Anastas'ieva, Z. (2012). Innovative health promoting technologies of physical education for students. *Sportivnij visnik Pridniprovia*, 2, 10–12. (in Ukrainian)
- Nosko, M., Razumeyko, N., Iermakov, S., & Yermakova, T. (2016). Correction of 6 to 10-year-old schoolchildren postures using muscular-tonic imbalance indicators. *Journal of Physical Education and Sport*, 16(3), 988-999. doi:10.7752/jpes.2016.03156
- O'Leary, N., Wattison, N., Edwards, T., & Bryan, K. (2015). Closing the theory–practice gap Physical education students' use of jigsaw learning in a secondary school. *European Physical Education Review*, 21, 176–194.

- Osipov, A.Yu., Fedorova, I.A., Kochetkova, T.N., & Loginov, D.V. (2017). Assessment of the level of physical activity of students. *Problemy Sovremennogo Pedagogicheskogo Obrazovaniya*, 54(3), 157–164. (In Russian).
- Podrigalo, L., Iermakov, S., Potop, V., Romanenko, V., Boychenko, N., Rovnaya, O., & Tropin, Y. (2017). Special aspects of psycho-physiological reactions of different skillfulness athletes, practicing martial arts. *Journal of Physical Education and Sport*, 17, 519–526. doi:10.7752/jpes.2017.s2078
- Potop, V. (2013). Assessment of physical and technical training level in basic specialization stage in women's artistic gymnastics. *Journal of Physical Education and Sport*, 13(1), 114–119. doi:10.7752/jpes.2013.01019
- Potop, V., Manole, C., Nistor, D., & Andreyeva, N.O. (2015). Didactic technologies of learning the double back somersault on floor based on the biomechanical analysis of sports technique in women's artistic gymnastics. *Journal of Physical Education and Sport*, 15(1), 120–127. doi:10.7752/jpes.2015.01020
- Prosvirina, L.N., Kolokoltsev, M.M., Kolchanova, M.A., Cieslicka, M., & Stankiewicz, B. (2015). The characteristic of the engine qualities of the students of technical institute of III functional health group (special medical group). *Physical Education of Students*, 19(1), 43–49. doi:10.15561/20755279.2015.0107
- Rocha, A., Martins, A., Freire, J. C., Kamel Boulos, M. N., Vicente, M. E., Feld, R., ... Rodríguez-Molinero, A. (2013). Innovations in health care services: The CAALYX system. *International Journal of Medical Informatics*, 82(11), e307–e320. doi:10.1016/j.ijmedinf.2011.03.003
- Roters, T.T. (2013). Physical improvement of students during interactive physical and aesthetic education. *Physical Education of Students*, 17(4), 72–76. doi:10.6084/m9.figshare.663624
- Shypulo, I. P. (2015). Influence employment by improving aerobics on motor readiness of girls. *Physical Education of Students*, 19(1), 67–71. doi:10.15561/20755279.2015.0110
- Skead, N.K., & Rogers, S.L. (2016). Running to well-being: A comparative study on the impact of exercise on the physical and mental health of law and psychology students. *International Journal of Law and Psychiatry*, 49, 66–74.
- Standal, O.F., Moen, K.M., & Moe, V.F. (2014). Theory and practice in the context of practicum: The perspectives of Norwegian physical education student teachers. *European Physical Education Review*, 20, 165–178.
- Stepanova, O.N., & Borodulina, O.V. (2016). The effect of fitness training on psychosomatic state of female students with articular ligamentous system disorders. *Uchenye zapiski universiteta imeni P.F. Lesgafta*, 1 (131), 228–232. (in Russian)
- Stetsenko, A.I., & Arhipenko, V.A. (2015). Special aspects of motivation of the structural subdivisions of the state emergency service of Ukraine in terms of physical self-culture. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 19(3), 58–63. doi:10.15561/18189172.2015.0309
- Swagatam, Das., Subhodip, Biswas., & Souvik, Kundu. (2013). Synergizing fitness learning with proximity-based food source selection in artificial bee colony algorithm for numerical optimization. *Applied Soft Computing*, 13(12), 4676–4694.
- Tajmazov, V.A., Kriuchek, S.S., & Grigor'ev, V.I. (2010). Physical culture and sports development concept in higher professional education system. *Scie. conf. "Physical Culture of Students", St. Petersburg, 2010*. St. Petersburg; 2010. P. 3. (in Russian)
- Vaskov, Y.V., & Sizonenko, I.E. (2015). The ways of implementing interactive methods in the educational process of students of higher educational institutions. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 19(2), 11–15. doi:10.15561/18189172.2015.0202
- Vishniakova, E.G. (2007). *Interdisciplinary educational and methodical e-complex to increase efficiency of academic education process*. PhD. Diss. Volgograd. (in Russian)
- Vitun, V.G. (2009). *Formation of adaptive potential of university students in physical education process*. PhD. Diss. Magnitogorsk. (in Russian)
- Yermakova, T.S. (2015). Individualization of forming health culture in schoolchildren of Polish schools. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 19(1), 29–33. doi:10.15561/18189172.2015.0106
- Yurchyshyn, Y.V. (2014). Students' motivation building technology to motor activity of health improving direction during physical training. *Journal of Health Sciences*, 1, 109–116.